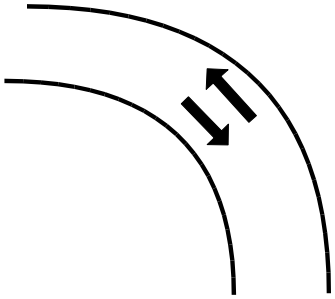
FACT SHEET

Module 4.2 Types of Curves

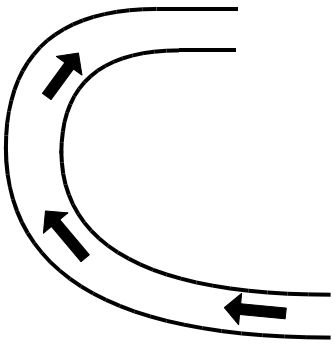
There are different types of curves. One way to describe a curve is by its radius. Every curve follows part of the circumference of one or more circles (an arc), and the radius is the distance from the center of the circle to the curve itself. The larger the radius, the gentler the curve and the easier it is to negotiate.

1. **Constant Radius.** A curve that follows the circumference of just one circle is called a constant-radius curve.



2. **Decreasing Radius.** This type of corner is very deceptive and dangerous. The further the car goes into the curve, the more steering is needed. When the driver realizes the need to slow down, he takes his foot off the gas pedal. With a front wheel drive car, the result can be power-off understeer, and a loss of steering control. Many corners have several changes of radius, further challenging the driver.

   Some curves that do not have a decreasing radius are even more dangerous because it is not obvious. The problem with a decreasing radius turn is that you can find yourself going too fast to exit it safely even though you were not going too fast for the first part of the curve. That is, unlike a constant radius turn, there is not one smooth line through this kind of curve which has a single apex to it that allows you to pick a single stable lean/speed through it.



   There are three scenarios that individually or combined result in a curve that must be treated as if it is decreasing radius:

   1. The early part of the curve provides a more positive camber (leans inward) than does the latter part of the curve.

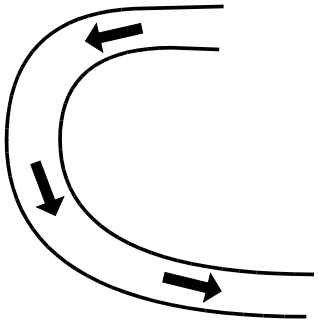
2. There is a rising elevation in the early part of the curve and a falling elevation towards its end.
3. The traction in the early part of the curve is better than towards the end.

Though each of the curves described above has a constant radius, they must be treated in the same way as a decreasing radius curve in order to negotiate them safely.

On any unfamiliar road avoid trying to take the curves as fast as they look to be.

3. Increasing Radius

The radius of the curve as you enter it is smaller than the radius of the curve as you exit. The angle of this corner opens progressively after the apex.



4. **Uphill.** In this type of curve, the car will naturally try to lose speed. Most drivers would respond by pushing more on the throttle pedal, which could possibly result in loss of steering control.

Road to Hells Canyon

5. **Downhill.** In this type of curve, the car will naturally try to pick up speed. Most drivers would respond by backing off the throttle pedal, which could possibly result in loss of steering control due to power-off understeer. Selection of lane position for best line of sight is important, as shown in the photos below.

Road to Hells Canyon

6. **Camber/ Banked.** Camber is the "tilt" of the road surface. Most road corners are designed with a little bit of "banking" to assist cars by improving cornering force and traction.

   Positive camber/ banking allows centrifugal force to squeeze the tires into the asphalt. Most freeways and their entrance and exit ramps are built this way. The photos above show a left curve similar to the car to the right.

Road camber affects tire grip

   Negative camber/banking means the opposite; the corner actually tilts in a way that reduces cornering force and traction. Centrifugal force reduces gravity's pull on the tires into the asphalt which can lift tires off the roadway. These corners are deceptive because they look faster than they really are. Once a driver gets half way through one, he might decide to try to slow down by backing off the throttle, resulting in power-off understeer. The photos above show a left curve similar to the car to the right.

Road camber affects tire grip

7. **Blind.** A blind corner is one that has part of the corner obscured by a hill or trees, so that a driver cannot anticipate what to expect next. An unexpected surprise could lead to the driver attempting to slow down in the middle of the corner.

Road to Hells Canyon

8. **S curve.** An "S" Curve is a curve in one direction followed by a curve in the opposite direction, forming the shape of the letter S.

Road to Hells Canyon

9. **Winding Road** A winding road has a series of curves together. A lot of things are happening at once. Are any of the single curves within the winding road blind, banked, increasing in radius, decreasing in radius, uphill or downhill? Where does a driver brake, trail brake, and accelerate? Where are the apexes of each curve that are visible here?

Road to Brownlee Dam Camp Ground.

If you're negotiating an unfamiliar curve, a good rule of thumb is to plan a late apex rather than an early one. A late apex will prevent you from "running out of road" at the end of the curve.

http://www.msgroup.org/TIP065.html
http://www.pca-msr.org/drman.html